

REMARKS

INTRODUCTION

In accordance with the foregoing no claims have been amended. Claims 1-15 are pending and under consideration. Reconsideration is requested.

CLAIM REJECTIONS – 35 USC 103

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (U.S. 6,037,741) (hereinafter “Yamada”) in view of newly-cited Watanabe et al. (U.S. 5,424,960) (hereinafter “Watanabe”). This rejection is traversed.

Yamada discusses a controller 10 that includes a control ECU 100 that receives a torque command value mainly input from the outside and regulates the motor currents flowing through the three phases (U, V, and W phases) of the three-phase synchronous motor 40, current sensors 102 and 103 that measure the U-phase current i_u and the V-phase current i_v of the three-phase synchronous motor 40, filters 106 and 107 that remove high-frequency noises from the observed electric currents, and two analog-to-digital converters (ADC) 112 and 113 that convert the observed electric currents into digital data. Yamada, column 11, lines 31-41.

The Action admits that Yamada fails to teach at least the feature of a torque calculator calculating torque to be applied to the stepper motor from the driving current and from stored driving current settings. However, Watanabe is cited for teaching same.

For the following reasons, it is respectfully submitted that one of ordinary skill would not be taught the presently recited invention based on this combination.

Watanabe relates to an apparatus for measuring torque, inertia moment, output and backlash of a stepping motor 1. See, e.g., Col. 1, lines 8-12 and 27-29, and Col. 2, lines 6-9 35-38 and 59-60. This is a quality control of benchmark measuring to be compared to actual corresponding performance characteristics of an assembled stepper motor. See Abstract, Col. 5, lines 43-54 and Col. 25, line 6 to Col. 26, line 5.

The driving current to be detected by the current detector 10 of Watanabe is amplified by the amplifier 11 before being transmitted to the feature extractor 15 by way of the terminal S2 or the switch 12. The feature extractor 15 receives the coil current from the amplifier 11 and

detects the peak value i_P of the current to be temporarily stored in a measurement value memory 16 to the torque vs. current relation data stored in the reference value memory 14. The load torque data obtained in the above manner is displayed on a display 18 and also printed out by a printer 19. Watanabe, column 8, lines 6-25.

Claims 1-11

Claim 1 recites: "...a torque calculator to calculate torque applied to the stepper motor from the driving current and from stored driving current settings and to output a driving current setting signal corresponding to the calculated torque..." In contrast to claim 1, Yamada discusses a controller for a synchronous motor rather than a stepper motor, and Watanabe discusses an apparatus for measuring load torque (not compensating for torque) that does not output a driving current setting signal. Neither Yamada nor Watanabe, either alone or in combination, discloses calculating torque applied to the stepper motor from the driving current and from stored driving current settings and to output a driving current setting signal corresponding to the calculated torque.

Claims 2-11 are dependent on claim 1 and are therefore believed to be allowable for the reasons discussed above. Further, claims 2-11 recite features that patentably distinguish over Yamada nor Watanabe, taken alone or in combination. For example, claim 2 recites a current detector to detect driving current flowing into the stepper motor and to output the detected driving current to the torque calculator.

Withdrawal of the foregoing rejection is requested.

Claims 12-14

Claim 12 recites: "...outputting a driving current setting signal corresponding to torque applied to the stepper motor, the torque being computed from the driving current and from stored driving current setting information..." In contrast to claim 12, Yamada discusses a controller for a synchronous motor rather than a stepper motor, and Watanabe discusses an apparatus for measuring load torque that does not output a driving current setting signal. Neither Yamada nor Watanabe, either alone or in combination, disclose outputting a driving current setting signal corresponding to torque applied to the stepper motor.

Claims 13 and 14 are dependent on claim 12 and are therefore believed to be allowable for the reasons discussed above. Further, claims 13 and 14 recite features that patentably

distinguish over Yamada nor Watanabe, taken alone or in combination. For example, claim 14 recites that the driving current setting signal causes the driving current to be applied to the stepper motor in proportion to the torque applied to the stepper motor.

Withdrawal of the foregoing rejection is requested.

Claim 15

Claim 15 recites: "...calculating torque applied to the stepper motor from the driving current and from stored driving current settings and outputting a driving current setting signal corresponding to the calculated torque..." In contrast to claim 15, Yamada discusses a controller for a synchronous motor rather than a stepper motor, and Watanabe discusses an apparatus for measuring load torque that does not output a driving current setting signal. Neither Yamada nor Watanabe, either alone or in combination, disclose outputting a driving current setting signal corresponding to torque applied to the stepper motor.

Withdrawal of the foregoing rejection is requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

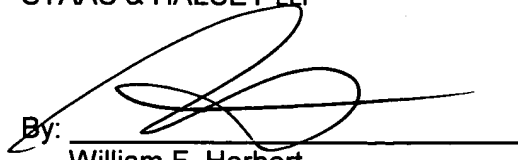
Respectfully submitted,

STAAS & HALSEY LLP

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6/2/05

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